

1. In a computer system that accesses a database having one or more data tables, a method for configuring the database to provide a table change notification when content in one of the data tables is altered, the method comprising the following:

an act of selecting a data table that is to be monitored for content changes;

an act of inserting a record that corresponds to the selected data table into a change notification table, the corresponding record including versioning information for the selected data table;

an act of assigning a trigger to the selected data table, the trigger causing the versioning information for the selected data table to be updated in the change notification table when content in the selected data table is altered;

an act of updating the versioning information in the change notification table in response to content in the selected data table being altered; and

an act of returning the updated versioning information to a requesting server computer system such that the updated versioning information can be used to determine the validity of content in a cache entry at the server computer system.

2. The method as recited in claim 1, wherein the act of selecting a data table that is to be monitored for content changes comprises an act of receiving user-input that selects a data table is to be monitored for content changes.

3. The method as recited in claim 1, wherein the act of selecting a data table that is to be monitored for content changes comprises an act of the computer system automatically selecting a data table in response to a received Web request.

4. The method as recited in claim 1, wherein the act of inserting a record that corresponds to the selected data table into a change notification table compromises an act of inserting the record in response to user-input.

5. The method as recited in claim 1, wherein the act of inserting a record that corresponds to the selected data table into a change notification table compromises an act of the computer system automatically inserting the record in response to a Web request.

6. The method as recited in claim 1, wherein the act of inserting a record that corresponds to the selected data table into a change notification table compromises an act of inserting the record into a SQL table.

7. The method as recited in claim 1, wherein the act of assigning a trigger to the selected data table comprises an act of receiving user input instructing a trigger to be assigned to the selected data table.

8. The method as recited in claim 1, wherein the act of assigning a trigger to the selected data table comprises an act of the computer system automatically assigning a trigger to the selected table in response to receiving a Web request for content contained in the selected table.

9. The method as recited in claim 1, wherein the act of assigning a trigger to the selected data table comprises an act of the assigning a trigger that, when executed in

response to content in the selected data table being altered, will update a corresponding change ID in the table change notification table.

10. The method as recited in claim 1, wherein the act of updating the versioning information in the change notification table in response to content in the selected data table being altered comprises an act of executing the trigger.

11. The method as recited in claim 1, wherein the act of returning the updated versioning information to a requesting server computer system comprises an act of returning the updated versioning information to a requesting server computer system that constructs Web responses including content from the selected data table.

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12. In a server computer system that provides Web responses to requesting client computer systems, the Web responses potentially including content from one or more data tables in a database, the server computer system including a cache location that stores a portion of cached content previously received from a data table and cached versioning information that corresponds to the cached content, a method for invalidating the portion of cached content, the method comprising the following:

an act of querying a change notification table for versioning information corresponding to the one or more data tables;

an act of receiving a list of at least one data table that has changed since the server computer system last queried the change notification table, the list of at least one data table including current versioning information for the at least one data table;

an act of determining that the cached content is dependent on the at least one data table;

an act of comparing the current versioning information to the cached versioning information; and

an act of removing the portion of cached content from the cache location based on the results of the comparison.

13. The method as recited in claim 12, wherein the act of querying a change notification table for versioning information corresponding to the one or more data tables comprises an act of sending a query to the database.

14. The method as recited in claim 13, wherein the act of sending a query to the database comprises an act of sending a query that specifies cached version information

and selects only those tables and version information that no longer match the cached information.

15. The method as recited in claim 14, further comprising:

an act of receiving an empty result as a result of no table version information being altered.

16. The method as recited in claim 14, wherein the act of sending a query to the database comprises an act of sending a query that blocks in the database until a change is made to the requested table version information.

17. The method as recited in claim 16, wherein the act of sending a query that blocks in the database until a change is made to the requested table version information comprises an act of sending a query that blocks a corresponding thread in the server computer system until a change to the requested table version information is detected.

18. The method as recited in claim 16, wherein the act of sending a query that blocks in the database until a change is made to the requested table version information comprises an act of registering a callback in the server computer system, the callback configured to be called when a change to the requested table version information is detected.

19. The method as recited in claim 13, wherein the act of sending a query to the database comprises an act of sending a query that requests version information for all tables that are being monitored by the server computer system.

20. The method as recited in claim 19, further comprising:

an act of receiving the requested version information for all the monitored tables; and

an act of the server computer system comparing received version information to version information maintained at the server computer system.

21. The method as recited in claim 12, wherein the act of querying a change notification table for versioning information corresponding to the one or more data tables comprises an act of querying a change notification table for change IDs corresponding to the one or more data tables.

22. The method as recited in claim 12, wherein the act of receiving a list of at least one data table that has changed since the server computer system last queried the change notification table comprises an act of receiving a list of one or more versioning information data structures.

23. The method as recited in claim 12, wherein the act of determining that the cached content is dependent on the at least one data table comprises an act of determining that a cache entry is dependent on a key entry, the key entry being dependent on a data table such that invalidation of the key entry automatically invalidates the cache entry.

24. The method as recited in claim 12, wherein the act of comparing the current versioning information to the cached versioning information comprises an act of comparing a received change ID to a cached change ID.

25. The method as recited in claim 12, wherein the act of removing the portion of cached content from the cache location based on the results of the comparison comprises an act of automatically invalidating a dependent cache entry in response to invalidation of a key entry.

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26. In a server computer system that provides Web responses to requesting client computer systems, the Web responses potentially including content from one or more data tables in a database, the server computer system including a cache location that stores a portion of cached content previously received from a data table and cached versioning information that corresponds to the cached data, a method for accessing content that is to be presented to a requesting client computer system, the method comprising the following:

an act of receiving a Web request from a client computer system, the Web request requesting delivery of a Web response that is to include requested content contained in a data table, the data table being generally accessible to other applications that can alter content contained in the data table, including altering the requested content;

an act of determining that at least a portion of the content that is to be included in the Web response is not currently cached at the server computer system;

an act of accessing the requested content from the data table;

an act of constructing the Web response, the constructed Web response including the requested content;

an act of assigning a database cache dependency to at least a portion of the constructed Web response based on commands executed during construction of the Web response, the database cache dependency indicating that the at least a portion of the constructed Web response is dependent on the data table; and

an act of caching the at least a portion of the constructed Web response in a cache location at the server computer system; and

an act of delivering the constructed Web response to the client computer system in response to the Web request.



27. The method as recited in claim 26, wherein the an act of receiving a Web request from a client computer system comprises an act of receiving an HTTP request as a result of a browser at the client computer system accessing a corresponding URL.

28. The method as recited in claim 26, wherein the act of assigning a database cache dependency to at least a portion of the constructed Web response based on commands executed during construction of the Web response comprises an act of executing a directive that causes the constructed Web response to be dependent on a data table in the database.

29. The method as recited in claim 26, wherein the act of assigning a database cache dependency to at least a portion of the constructed Web response based on commands executed during construction of the Web response comprises an act of executing computer-executable instructions of a script that causes content from a data table to be dependent on the data table.

30. The method as recited in claim 26, wherein the act of assigning a database cache dependency to at least a portion of the constructed Web response based on commands executed during construction of the Web response comprises an act of assigning a cache entry to depend on a key entry, the key entry depending on the data table such that when the key entry is invalidated the cache entry is automatically invalidated.

31. The method as recited in claim 26, wherein the act of caching the at least a portion of the constructed Web response in a cache location at the server computer system comprises an act of caching the entire Web response.

32. The method as recited in claim 31, wherein the act of act of caching the entire Web response comprises an act of pushing the entire Web response to a second lower-level cache location.

33. The method as recited in claim 32, further comprising:  
an act of the server computer system removing the entire Web response from the second lower-layer cache location when the Web response is invalidated

34. The method as recited in claim 32, wherein the act of pushing the entire Web response to a second lower-level cache location comprises an act of pushing the entire Web response to an optimized system response cache.

35. In a server computer system that provides Web responses to requesting client computer systems, the Web responses potentially including content from one or more data tables in a database, the server computer system including a cache location that stores a portion of cached content previously received from a data table and cached versioning information that corresponds to the cached data, a method for accessing content that is to be presented to a requesting client computer system, the method comprising the following:

an act of receiving a Web request from a client computer system, the Web request requesting delivery of a Web response that is to include requested content contained in a data table, the data table being generally accessible to other applications that can alter content contained in the data table, including altering the requested content;

an act of determining that at least a portion of the content that is to be included in the Web response is not currently cached at the server computer system;

an act of accessing the requested content from the data table;

an act of constructing the Web response, the constructed Web response including the requested content; and

a step for storing the requested content such that the requested content can be efficiently accessed to satisfy subsequent Web requests; and

an act of delivering the constructed Web response to the client computer system in response to the Web request.

36. A computer program product for use in a computer system that access a database having one or more data tables, the computer program product for implementing a method for configuring the database to provide a table change notification when data in one of the data tables is altered, the computer program product comprising one or more computer-readable media having stored thereon computer executable instructions that, when executed by a processor, cause the computer system to perform the following:

select a data table that is to be monitored for data changes;

insert a record that corresponds to the selected data table into a change notification table, the corresponding record including versioning information for the selected data table;

assign a trigger to the selected data table, the trigger causing the versioning information for the selected data table to be updated in the change notification table when data in the selected data table is altered;

update the versioning information in the change notification table in response to data in the selected data table being altered; and

send the updated versioning information to a requesting server computer system such that the updated versioning information can be used to determine the validity of data in a cache entry at the server computer system.

37. The computer program product as recited in claim 36, wherein the one or more computer-readable media are physical media.

38. The computer program product as recited in claim 36, wherein the one or more computer-readable media include system memory.

39. A computer program product for use in a server computer system that provides Web responses to requesting client computer systems, the Web responses potentially including content from one or more data tables in a database, the server computer system including a cache location that stores a portion of cached content previously received from a data table and cached versioning information that corresponds to the cached content, the computer program product for implementing a method for invalidating the portion of cached content, the computer program product comprising one or more computer-readable media having stored thereon computer executable instructions that, when executed by a processor, cause the server computer system to perform the following:

query a change notification table for versioning information corresponding to the one or more data tables;

receive a list of at least one data table that has changed since the server computer system last queried the change notification table, the list of at least one data table including current versioning information for the at least one data table;

determine that the cached content is dependent on the at least one data table;

compare the current versioning information to the cached versioning information; and

remove the portion of cached content from the cache location based on the results of the comparison.

40. The computer program product as recited in claim 39, wherein the one or more computer-readable media are physical media.

41. The computer program product as recited in claim 39, wherein the one or more computer-readable media include system memory.

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42. A computer program product for use in a server computer system that provides Web responses to requesting client computer systems, the Web responses potentially including content from one or more data tables in a database, the server computer system including a cache location that stores a portion of cached content previously received from a data table and cached versioning information that corresponds to the cached data, the computer program product for implementing a method for accessing content that is to be presented to a requesting client computer system, the computer program product comprising one or more computer-readable media having stored thereon computer executable instructions that, when executed by a processor, cause the server computer system to perform the following:

receive a Web request from a client computer system, the Web request requesting delivery of a Web response that is to include requested content contained in a data table, the data table being generally accessible to other applications that can alter content contained in the data table, including altering the requested content;

determine that at least a portion of the content that is to be included in the Web response is not currently cached at the server computer system;

access the requested content from the data table;

construct the Web response, the constructed Web response including the requested content;

assign a database cache dependency to at least a portion of the constructed Web response based on commands executed during construction of the Web response, the database cache dependency indicating that the at least a portion of the constructed Web response is dependent on the data table;

cache the at least a portion of the constructed Web response in a cache location at the server computer system prior to delivering the constructed Web response to the client computer system; and

deliver the constructed Web response to the client computer system in response to the Web request.

43. The computer program product as recited in claim 42, wherein the one or more computer-readable media are physical media.

44. The computer program product as recited in claim 42, wherein the one or more computer-readable media include system memory.

45. The computer program product as recited in claim 42, wherein computer-executable instructions that, when executed by a processor, cause the server computer system to assign a database cache dependency to at least a portion of the constructed Web response based on commands executed during construction of the Web response comprise a directive that, when executed by a processor, causes the server computer system to assign a database cache dependency to the entire constructed Web response.

46. The computer program product as recited in claim 42, wherein computer-executable instructions that, when executed by a processor, cause the server computer system to assign a database cache dependency to at least a portion of the constructed Web response based on commands executed during construction of the Web response comprise computer-executable instructions of a script that, when executed by a processor, cause the



server computer system to assign a database cache dependency to content retrieved from a data table.

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47. One or more computer-readable media having stored thereon a data structure that represents versioning information for a data table, the data structure comprising:

a table ID field representing a table ID that can be used to identify a data table; and

a change ID field representing a change ID for the data table identified by the table ID represented in the table ID field, the change ID being used to determine if a cache entry is to be invalidated.

48. The one or more computer-readable media having stored thereon a data structure that represents versioning information for a data table as recited in claim 47, the data structure further comprising:

a date field representing a date when the data structure representing versioning information for the data table identified by the table ID represented in the table ID field was inserted into a change notification table.

49. The one or more computer-readable media having stored thereon a data structure that represents versioning information for a data table as recited in claim 47, the data structure further comprising:

a page content field representing page content that is dependent on the data table identified by the table ID represented in the table ID field.